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Instruction Book

No. 8368

Supersedes No. 8189

Searchlight Projectors

GENERAL ELECTRIC COMPANY

SCHENECTADY, N. Y.

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Fig. 1

PILOT HOUSE CONTROL PROJECTOR

SEARCHLIGHT PROJECTORS

The projectors manufactured by the General Electric Company for Government and Commercial use are alike in form, and differ only in finish, equipment of mirrors, and parts included in a complete outfit.

SIZES

Projectors are made in the following sizes, or classes, rated by the diameter of their mirrors, and the following types of control:

TYPE	CLASS
HC	9″
PC	9″
HC	13″
PC	13″
HC	18″
PC	18″
HC	24″
PC	24″
HC	30″
HC	36″

In addition, a line of electric control projectors is manufactured in the 24″, 30″ and 36″ sizes.

MIRRORS

With all Commercial projectors Mangin mirrors which have been found eminently satisfactory, are

furnished, unless otherwise ordered, up to and including the 18″ size. All larger projectors have Parabolic mirrors on account of the weight of the glass.

Mangin mirrors are cheaper to grind than Parabolic mirrors, and have been found to give excellent satisfaction. The Parabolic mirror reflects a beam somewhat more intense at the edge than that from the Mangin mirror in which the glass is quite thick at the rim.

The projector barrels are so made that they may be balanced with either mirror, so that if desired, projectors may be furnished with Parabolic mirrors. Both the Parabolic and Mangin mirrors are mounted in a metal frame in such a manner as to allow for expansion and contraction, due to the heating and cooling, and also to afford protection from sudden shocks.

FINISH

The 9″, 13″ and 18″ projectors are finished in polished brass with black trimmings; all larger sizes are finished in dead black throughout.

LAMPS

The lamps are of the horizontal type, which has proven to be more reliable than the vertical type, with carbons coinciding with the axis of the mirror; they have positive screw driven feed without springs or clockwork.

When carboning the lamp, see that the larger, or positive carbon is in the carbon clamp nearer to the feeding mechanism; and when inserting the lamp in the projector barrel see that the positive carbon is farthest from the mirror. The sizes of carbons used with the

different projectors are given in the following table and should be of the best searchlight grade obtainable

LAMP	AMPS.	VOLTS AT ARC	POSITIVE CARBONS	NEGATIVE CARBONS
9″	10	45	$\frac{1}{2}$″x $5\frac{1}{2}$″ cored	$\frac{7}{16}$″x $3\frac{1}{2}$″ solid
13″	20	45	$\frac{5}{8}$″x 6 ″ "	$\frac{1}{2}$″x $4\frac{1}{2}$″ "
18″	35	45	$\frac{13}{16}$″x $8\frac{1}{2}$″ "	$\frac{3}{8}$″x 5 ″ "
24″	50	48	1 ″x12″large core	$\frac{3}{4}$″x 7″small core
30″	80	50	$1\frac{1}{8}$″x12″ "	$\frac{7}{8}$″x 7″ "
36″	110	60	$1\frac{1}{4}$″x12″ "	1 ″x 7″ "
48″	130	62	$1\frac{7}{8}$″x15″ "	$1\frac{3}{16}$″x12″ "
60″	175	65	2 ″x15″ "	$1\frac{3}{8}$″x12″ "
80″	200	65	$2\frac{1}{4}$″x15″ "	$1\frac{3}{4}$″x12″ "

The ordinary commercial grade of carbons will not give as good satisfaction as the better grades, particularly with the large currents which require carbons of very homogeneous texture, and free from all inequalities and imperfections likely to cause hissing and flaming

The carbon clamps are separated for inserting a fresh pair of carbons, by turning the screw H, Fig 2 It is not necessary to remove the lamp from the projector barrel to do this, as the wrench may be inserted through the hole E, Fig 7, in the rear of the lamp casing frame

When the lamp is burning, in case the crater burns to one side, the positive carbon may have to be adjusted to bring the crater back to the center of the carbon

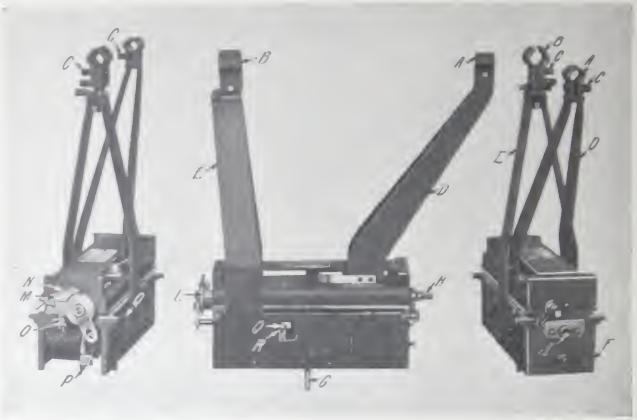


Fig. 2

A Negative carbon holder.
B Positive carbon holder.
C Clamping screws for carbon clamps.
D Negative carbon support.
E Positive carbon support.
F Lamp frame.
G Main line contact studs.
H Hand feed screw.
I Fixed nut for focusing screw.
L Ratchet.
M Pawl.
N Pawl spring.
O Adjusting screw for ratchet arm.
P Feeding magnet armature.
Q Feeding magnet contact screw.
R Feeding magnet contact spring.

In case of accident, if the adjustment is changed so that the lamp does not burn at the right voltage at the arc, as given in the table, connect a voltmeter across the terminals G, when the lamp is running. If the voltage is below normal, tighten the feeding magnet armature spring by turning the nut on the tightening screw until the adjustment is right. The tighter this spring, the longer the arc, and the higher the voltage across it. Instances have been known where the adjustment was changed accidentally or by careless handling, so that the spring was slack enough to allow the carbons to feed into intimate contact, thus producing no light whatever.

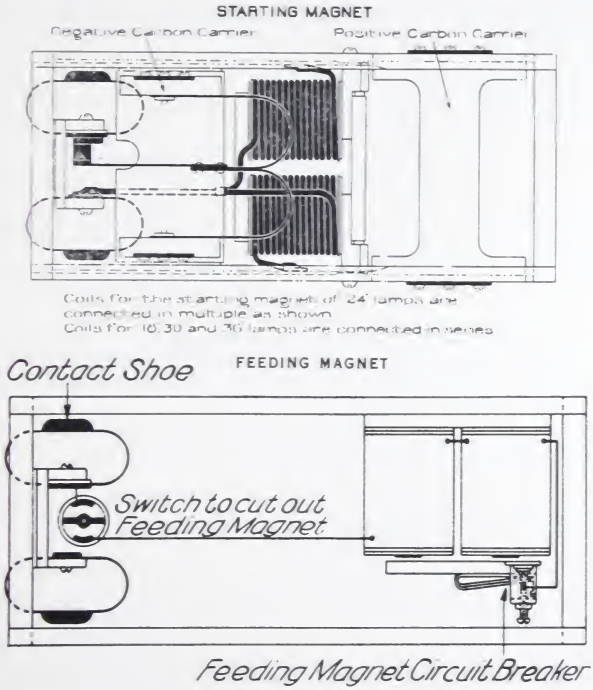


Fig. 3

This adjustment, however, should not be touched except in case of actual trouble, as proper adjustment is made at the factory, where every lamp is tested before shipping.

After carbons have been burned as far as they can be fed by the lamp mechanism, *i. e.*, when the carbon carriages have fed together to the limit of their travel, the main switch to the projector should be opened to avoid over-heating the feeding magnets, due to the increased voltage.

When inserting the lamp in the projector drum, pass it in through the front door and drop it into place so that the lugs on the sides engage with the slots in the rail which supports the lamp. Then slide the lamp back until the focusing screw engages with nut I, when by turning the focusing screw, the lamp may be drawn back into its correct position.

THE CUTOUT

The Feeding Magnets are wound to stand 125 volts but should the line voltage exceed that amount, it will be necessary to install a cutout, when the lamp is not burning, this cutout automatically inserts in the circuit a resistance equivalent to that of the arc, thereby cutting down the voltage and preventing the burnout of the feeding magnet. Diagram of connections for this arrangement is shown in Fig. 4.

PROJECTORS IN SERIES

By the means of cutouts two or more projectors may be run in series, if the line voltage is sufficient, theeeby reducing the loss in the rheostat. The diagram of connections for this arrangement is shown in Fig. 5. The rheostat should be of sufficient size to cause a drop in

voltage equal to the difference between the sum of the arc voltages, and the line voltage

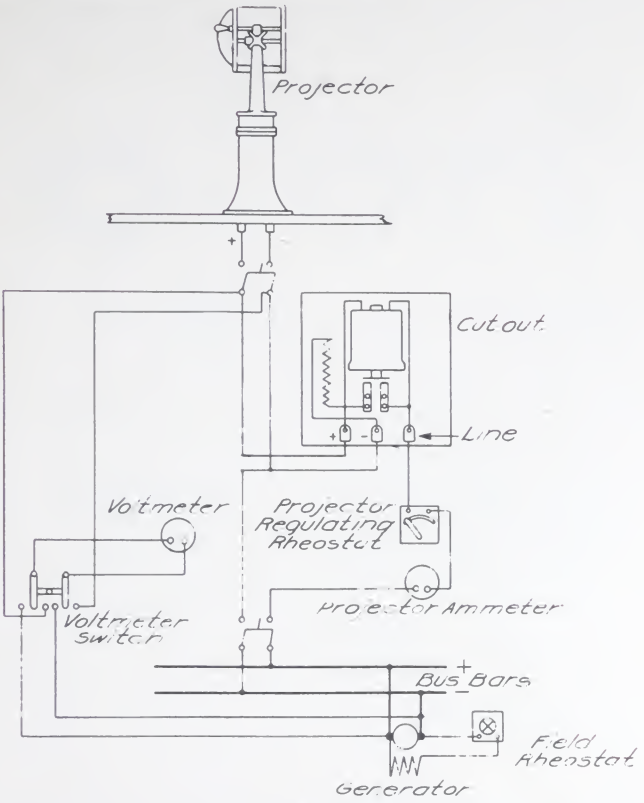


Fig. 4

Should the circuit be grounded, the operator must use care in handling and adjusting the lamps

OBTURATOR

With the larger sizes of projectors, *viz.*: 24″, 30″ and 36″, obturators which tend to prevent the arc from wandering, are furnished

The obturator consists of an electro-magnet magnetized by the current flowing through the carbons and a shutter to prevent the direct rays from leaving the

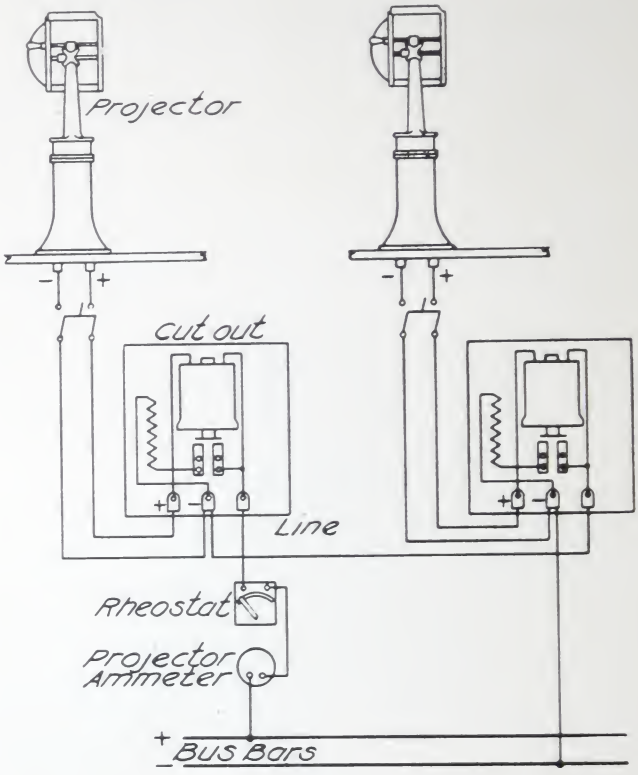


Fig 5

barrel The normal position of the magnet is with the opening at the top, in which position it is held by a pin and a chain, as shown on the left-hand of Fig 6 When placing the lamp in the projector barrel, first remove shutter, then remove the pin and turn the magnet so

that the opening is at the bottom. The obturator will then be in the position indicated at the right of the accompanying illustration. After the lamp is in place, return the arc magnet to its original position, secure in place with the pin, and insert shutter.

Fig. 6

FOCUSING

The lamp is adjusted forward or backward when burning, until the arc is in the focus of the mirror, by means of the focusing screw which engages a fixed nut on the lamp frame. The right adjustment is best found by watching the beam. When the arc is too near the mirror, the beam diverges, and when too far away it converges, even to the extent of being hour-glass in shape, the rays crossing each other.

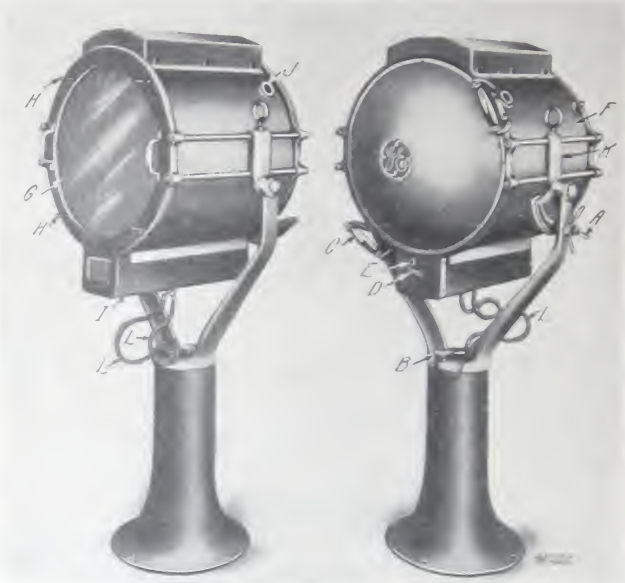


Fig. 7

A Clamp for vertical movement.
B Clamp for horizontal movement.
C Training handles.
D Focusing screw.
E Socket for inserting wrench when feeding by hand.
F Sliding doors used when adjusting lamp and cleaning mirror and front door.
G Front door.
H Front door latches.
I Case protecting lamp mechanism.
J Side peepsight.
K Trunnion block.
L Lamp cables.

FRONT DOORS

The standard door consists of plain glass strips, and this will be furnished, unless otherwise ordered. Doors consisting of plano-convex strips (cylinder lenses) diverging the beam horizontally only, and interchangeable with the plain door can be supplied when specially ordered. These doors can be furnished of a divergency of 10°, 20°, and 40°, but 10° will be furnished when a diverging door is ordered without stating the angle of divergence.

The strength of illumination is less the larger the angle, so that it is preferable to use the smallest angle of divergency possible, unless for very short range work.

INSTALLING

Hand Control

Bolt the projector to the deck, passing the leads through holes previously drilled and provided with porcelain or other insulating bushings. The leads are marked + and −, and should be so connected to the generator circuit in order that the lamp will burn correctly with relation to the mirror. Diagram of connections, Fig. 8, shows a very desirable method of connecting both the hand and pilot house control projectors, as it provides for the location of all instruments and means of adjustment in the dynamo room under the eye of the attendant.

With the voltmeter switch the voltmeter may be used to show the generator voltage, and also by means of two pilot wires passing to the projector itself, the voltage at the projector. This latter connection is used when adjusting the lamp in case of disarrangement of the feeding magnet spring.

Pilot House Control

Cut a hole through the pilot house to fit the inside of the low pedestal furnished, and provide a rubber

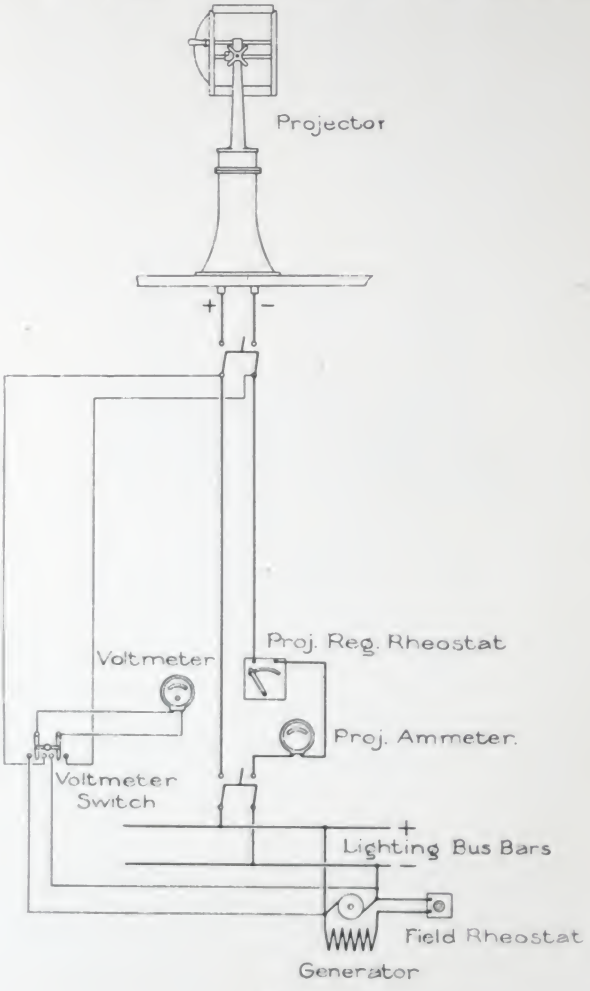


Fig. 8

gasket between the pedestal and the pilot house, to prevent moisture from penetrating inside.

In case of the smaller projectors, the manipulating gear cannot be passed through this hole when assembled, but the bow and handle may be easily removed and re-attached after the projector is bolted in place.

The plungers, together with the terminals which are fastened to them, are marked + and −, and these marks should be followed when connecting up the projector.

Fig. 9

Rope Control

Install the projector similarly to the pilot house control type fastening the manipulating gear pertaining to the projector after it is bolted in place.

The operating gear for the manipulating end will be mounted in the pilot house, or at the point from which it is desired to control the movement of the projector, and if in the pilot house, the necessary holes should be bored through which the ropes pass to the projector. Connect the operating ropes to the pulleys as shown and stretch them very tightly, taking up all slack by

means of turnbuckles, so that the ropes will be tight as possible.

If it is necessary to run the ropes around corners, the guide pulleys should be about 6″ in diameter, as the wire rope being stiff will last longer, and the gear will work better if the pulleys are of this diameter. If the guide pulleys are simply to take up the sag of the rope, they can be smaller.

RHEOSTATS

The rheostats are made of resistance tubes or iron grid, and are designed for 110-125 volt circuits. In ordering projectors it is necessary to state the voltage of the circuit from which current is supplied.

The following rheostats are standard.

COMMERCIAL PROJECTOR RHEOSTATS

CAT. NO.	SIZE OF PROJECTOR	VOLTAGE OF CIRCUIT
58723	9″	110–125
58725	13″	110–125
58726	18″	110–125
58727	24″	110–125

OUTFITS

Commercial Hand Control

The Commercial hand control projector outfit includes the following apparatus:

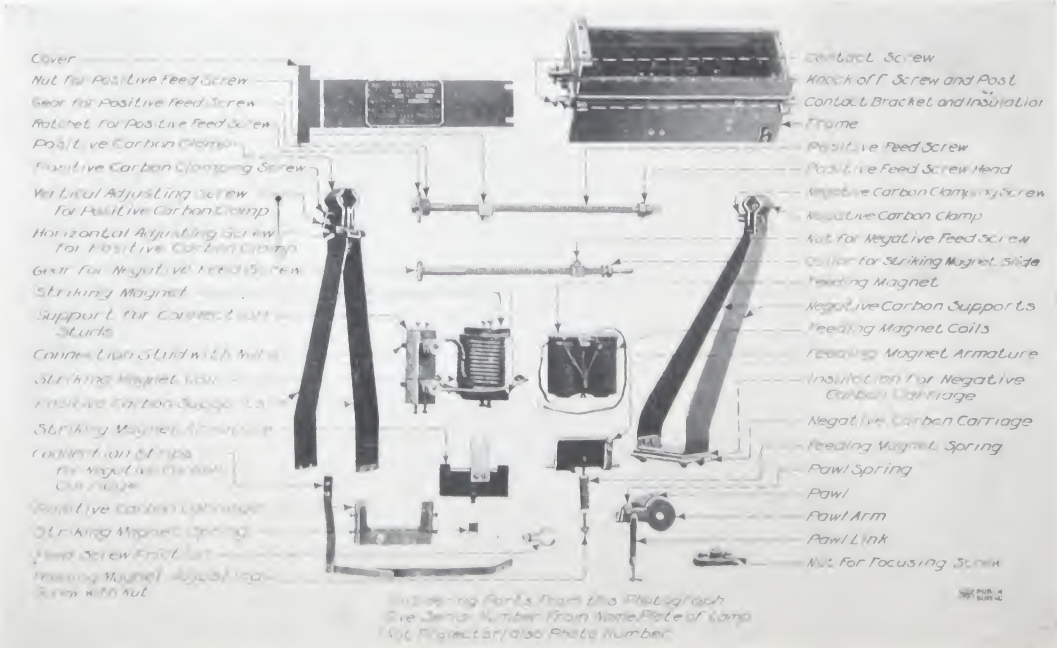
1 Projector with pedestal.
1 Lamp.
1 Plain front door.
1 Mirror.

1 Rheostat.
25 Pairs of carbons.
1 Tool box containing
- 1 Carbon clamp wrench.
- 1 Small frame with smoked glass.
- 1 Chamois skin.
- 1 Small dust brush.
- 1 Extra feeding magnet armature spring.
- 1 Extra feeding magnet contact spring.
- 1 Extra feeding magnet contact screw.
- 1 Focusing wrench.
- 1 Small wrench.

The pilot house control projector outfit includes the same apparatus. The projector, however, is not provided with a pedestal, but with lever controlling mechanism.

A modification of the pilot house control is the rope control, shown in Fig. 9. This outfit is the same as the pilot house control, but includes the additional controlling gear.

With any of the above projectors, if ordered, canvas covers can be supplied, but do not constitute a part of the regular outfit.



In ordering Parts from this Photograph
Give Serial Number from Name Plate of Lamp
Your Projector also Photo Number

PARTS OF SEARCHLIGHT PROJECTOR

GENERAL ELECTRIC COMPANY

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